

Work Order ID 72975

Tuesday, August 23, 2011 8:15:19 AM

Page 1

Item ID: D206-667-201TRN

Revision ID: U/R OK 11.09.26

Item Name: Crosstube Turning Detail

Start Date: 8/23/2011 Start Qty: 1.00

Required Date: 9/7/2011 Req'd Qty: 1.00

Reference:

Approvals:

Process Plan:

Date: 11-08-23 Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start

Stop

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D206-667-241

Rev C

100

0.00



Mori Seiki

MORI SEIKI CNC LATHE LARGE

Memo

0.00

Mori Seiki CNC Lathe Large

1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA084

2-Turn first side as per Folio FA084

3-Blend transition lines only, \*\*do not sand whole tube\*\*:

\*Use mill bastard file, brush file repeatedly with file card.

\*Do not use sandpaper coarser than 320 grit.

1 Ø  
mom.L 11/09/21

110

QC1- Inspect dimensions to dimension sheet

0.00



QC

Memo

0.00

Quality Control

1 Ø  
mom.L 11/09/21

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 72975

Tuesday, August 23, 2011 8:15:19 AM



Page 2

Item ID: D206-667-201TRN

Accept



Setup Start



Revision ID: U/R

Stop



Item Name: Crosstube Turning Detail

Start Date: 8/23/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 9/7/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date:

QC: Date: SPC (Y/N): Date:

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
120  Mori Seiki Mori Seiki CNC Lathe Large	MORI SEIKI CNC LATHE LARGE  Memo 1-Turn second side as per Folio FA084  2-File down transition lines smooth.  3-Blend transition lines only, **do not sand whole tube**: *Use mill bastard file, brush file repeatedly with file card. *Do not use sandpaper coarser than 320 grit.	0.00  0.00							<i>l B</i> <i>mm.L 11/09/21</i>
130  QC Quality Control	QC1- Inspect dimensions to dimension sheet  Memo	0.00  0.00							<i>l B</i> <i>mm.L 11/09/21</i>
140  QC Quality Control	QC8- Inspect parts - second check  Memo	0.00  0.00							<i>mm.L 11/09/21</i> <i>l B</i>

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 72975

Tuesday, August 23, 2011 8:15:19 AM



Page 3

Item ID: D206-667-201TRN

Accept



Setup Start



Revision ID: U/R

Item Name: Crosstube Turning Detail

Stop



Start Date: 8/23/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 9/7/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan: Date:

Tooling: Date:

Run Start



QC: Date:

SPC (Y/N): Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

150

Crosstubes Chemical Conversion

0.00

SW

11-09-22



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

160

QC3- Inspect Part Finish

0.00

DD

11-9-23



QC

Memo

0.00

Quality Control

170

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and Stock in kanban rack. Location:

46

DD

11-9-23

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 72975**

Tuesday, August 23, 2011 8:15:19 AM

Page 4

Item ID: D206-667-201TRN

Accept

Setup Start

Revision ID: U/R

Stop

Item Name: Crosstube Turning Detail

Start Date: 8/23/2011 Start Qty: 1.00

Cust Item ID:

Required Date: 9/7/2011 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date:

Run Start

QC: Date: SPC (Y/N): Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run HoursTool ID Tool # Plan  
Code Accept Reject Reject Insp.  
Qty Qty Number Stamp

180

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

n/9/27

ME 11-09-26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# Picklist Print

Tuesday, August 23, 2011 8:15:25 AM

Page 1

Work Order ID: 72975



Parent Item: D206-667-201TRN



Parent Item Name: Crosstube Turning Detail

Start Date: 8/23/2011

Required Date: 9/7/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A 08-03-06 new issue DD verified by:ec  
IPP Rev B 08.04.02 Removed polish EC verified by:DD  
IPP Rev:C 08-12-23 revc as per dwg DD verified by JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D6003-102		Manufactured	No			110	Each	61.0000	1	1			



Crosstube, 206



Location

Loc Qty

Loc Code

LG

61

29116

12

8333

49

mm-L 11/09/21

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b> <i>22975</i>
<b>Description:</b> Crosstube Assembly	<b>Part Number:</b> D206-667-241
<b>Inspection Dwg:</b> D206-667-241 Rev: C	<b>Page 1 of 1</b>

### FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

	Inspection Sheet Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
SIDE A	30° x 0.500	+/-0.010	30° x .500	/		vern	cnc-08
	0.250	+/-0.010	.250	/		"	
	2.240	+0.005/-0.000	2.243	/		"	
	4.438	+/-0.030	4.435	/		"	
	1.780	+0.005/-0.000	1.784	/		"	
	R0.063	+/-0.010	.063	/		RG	
	1.851	+0.005/-0.000	1.856	/		vern	cnc-08
	1.928	+0.005/-0.000	1.933	/		"	
	2.005	+0.005/-0.000	2.008	/		"	
	2.082	+0.005/-0.000	2.086	/		"	
	2.159	+0.005/-0.000	2.164	/		"	
	2.190	+0.005/-0.000	2.194	/		"	
SIDE B	30° x 0.500	+/-0.010	30° x .500	/		vern	cnc-08
	0.250	+/-0.010	.250	/		"	
	2.240	+0.005/-0.000	2.242	/		"	
	4.438	+/-0.030	4.435	/		"	
	1.780	+0.005/-0.000	1.785	/		"	
	R0.063	+/-0.010	.063	/		RG	
	1.851	+0.005/-0.000	1.856	/		vern	cnc-08
	1.928	+0.005/-0.000	1.932	/		"	
	2.005	+0.005/-0.000	2.008	/		"	
	2.082	+0.005/-0.000	2.087	/		"	
	2.159	+0.005/-0.000	2.162	/		"	
	2.190	+0.005/-0.000	2.195	/		"	
	100.60	+/-0.020	100.6	/		tape	mm-L-02

<b>Measured by:</b> <i>mm.l</i>	<b>Audited by:</b> <i>mm.l</i>	<b>Prototype Approval:</b>	N/A
<b>Date:</b> <i>11/09/21</i>	<b>Date:</b> <i>11/09/21</i>	<b>Date:</b>	N/A

Rev	Date	Change	Revised by	Approved
A	06.10.16	New Issue (P/O D206-667-201)	KJ/JLM	
B	09.05.20	Dwg Rev updated	KJ	

Item	Qty	Part Number	Description
	-241		
1	X	D206-667-241	CROSSTUBE ASSEMBLY (206B HIGH AFT)
2	1	D6003-102	CROSSTUBE
3	2	D2891-1	SUPPORT
4	4	D3595-063-395	RUBBER CUSHION
5	4	MS21920-20	CLAMP (OR MS21920-21)
6	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- MATERIAL: MANUFACTURED FROM D6003-102  
FINISHED LENGTH = 100.60±0.020
- FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- UNITS: INCHES UNLESS OTHERWISE NOTED.
- BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- IDENTIFICATION: SCRIBE DART PART NUMBER "D206-667-241" AND BATCH NUMBER ON INSIDE OF CUFF USING VIBRATING STYLUS.
- WEIGHT: 22.5 lbs
- PART IS SYMMETRIC ABOUT CENTERLINE.
- RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- BEND PROGRESSIVELY WITH A MINIMUM OF 12 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS MECHANISMS ARE LOCATED ON CROSSTUBE CLAMPS.
- EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 7225

*11-08-23*

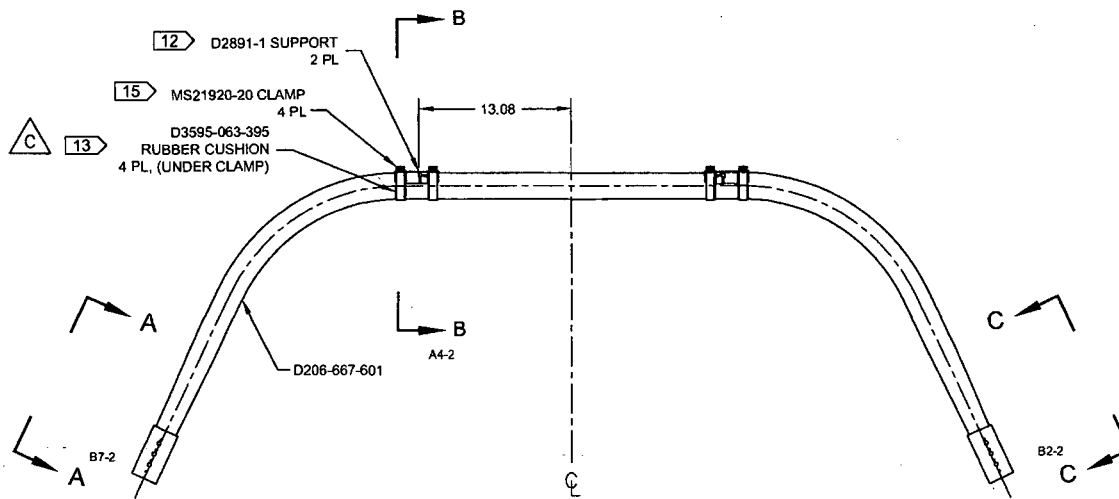
UNDER REVIEW

*11.06.13*

RELEASED  
*08/11/12*

C	REFORMAT/REVISE GENERAL NOTES/PART LIST (ZN D7-1); REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS. D3595-063-395 WAS D2856-400-694 (ZN D6-2 & A5-2); REMOVED REF. & ADD TOLERANCES (ZN C5-3, C4-3, D3-3); RELOCATED FLAG #6 (ZN A7-3) PER NCK 210; MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	08.11.06
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	CP	00.11.17
REV.	DESCRIPTION	BY	DATE
DESIGN	<i>qp</i>	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	<i>RF</i>	DRAWING NO. D206-667-241	
CHECKED	<i>qp</i>	REV. C	
MFG. APPR.	<i>qp</i>	SHEET 1 OF 4	
APPROVED	<i>qp</i>	TITLE CROSSTUBE ASSY (206B HIGH AFT)	
DE APPR.	<i>qp</i>	SCALE NTS	
DATE	08.11.06	COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

8 7 6 5 4 3 2 1



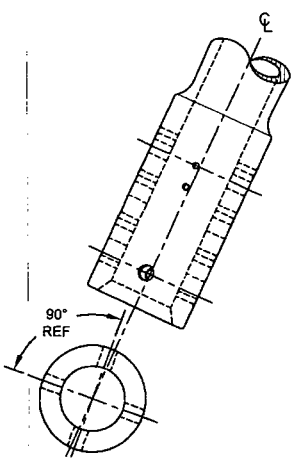
72975

UNDER REVIEW

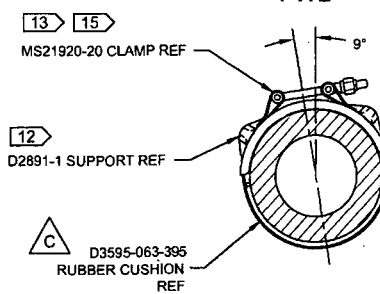
08.11.06

RELEASED  
08/11/12 MJD

D206-667-241  
ASSEMBLY DETAIL  
(VIEW LOOKING FWD)

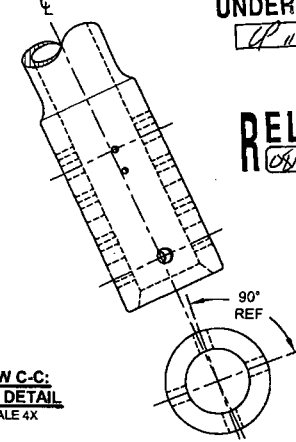


VIEW A-A:  
CUFF DETAIL  
SCALE 4X



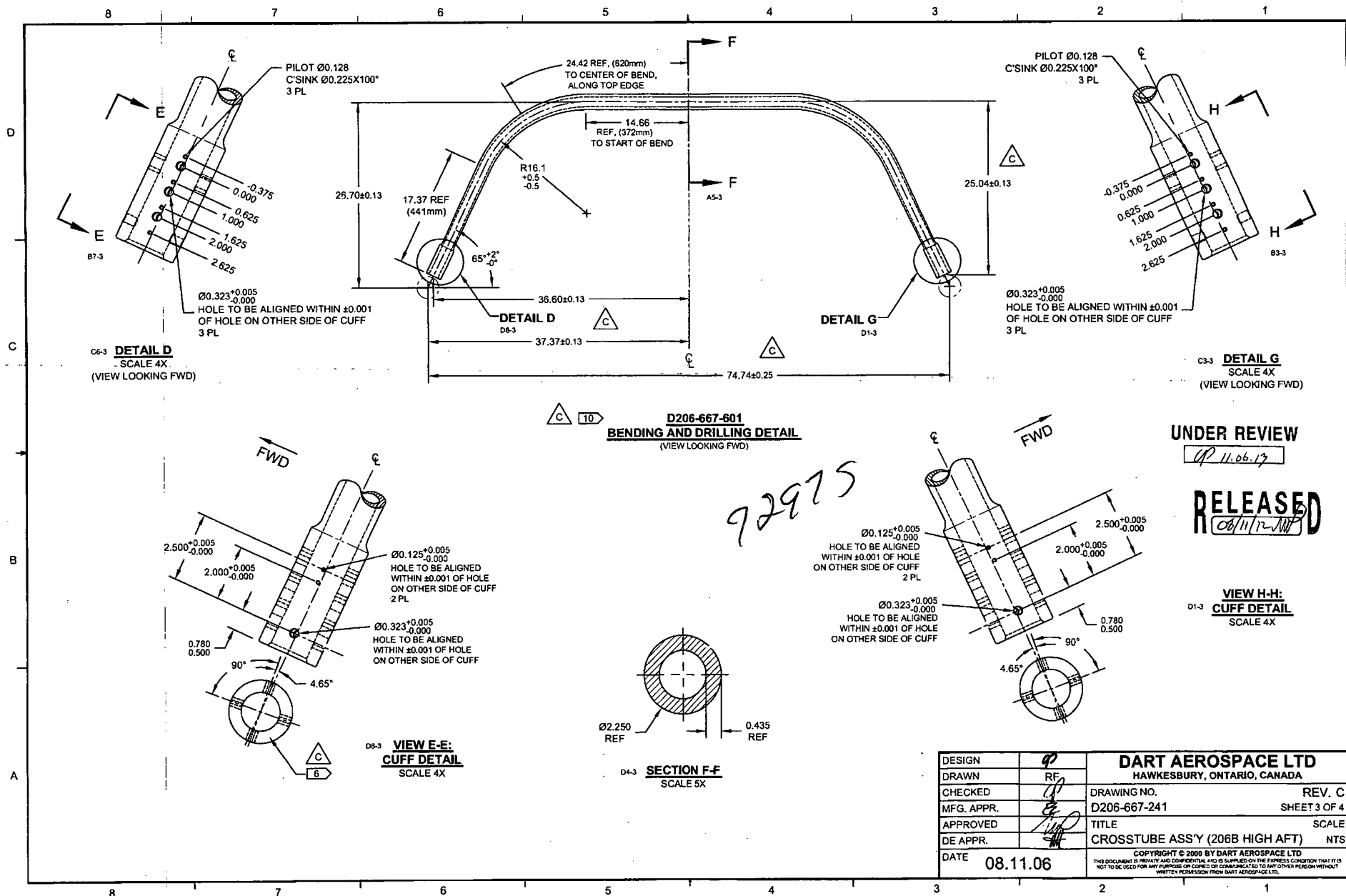
SECTION B-B  
SCALE 5X

VIEW C-C:  
CUFF DETAIL  
SCALE 4X



DESIGN	40	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	40	DRAWING NO.	REV. C
MFG. APPR.	40	D206-667-241	SHEET 2 OF 4
APPROVED	40	TITLE	SCALE
DE APPR.	40	CROSSTUBE ASSY (206B HIGH AFT)	NTS
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8 7 6 5 4 3 2 1



DESIGN	92975	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO.	REV. C
MFG. APPR.	RF	D206-667-241	SHEET 3 OF 4
APPROVED	RF	TITLE	SCALE
DE APPR.	RF	CROSSTUBE ASSY (206B HIGH AFT)	NTS
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8 7 6 5 4 3 2 1

D

C

B

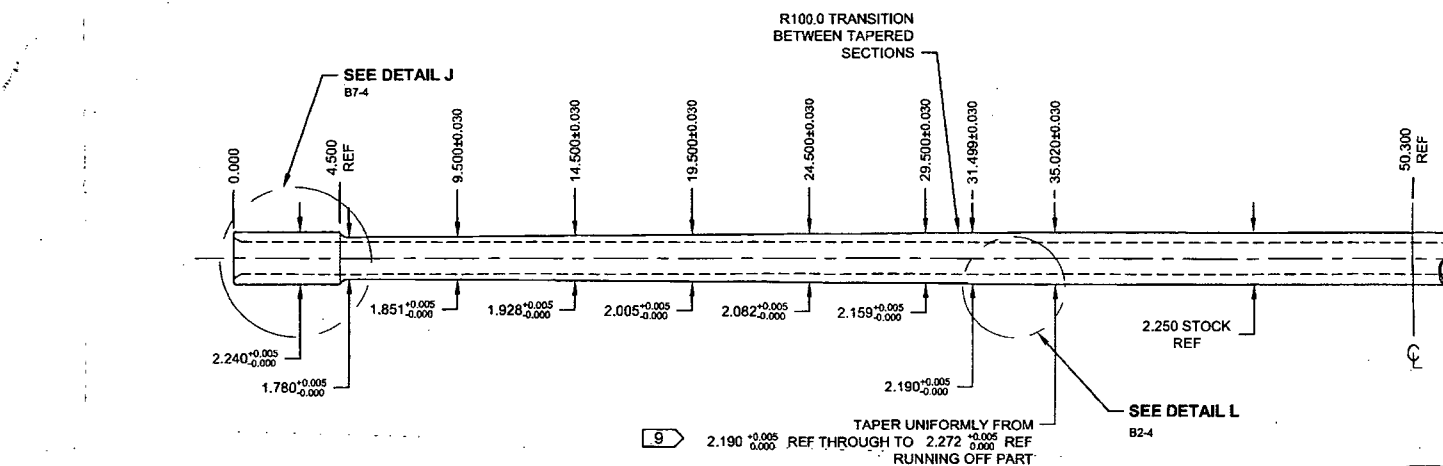
A

D

C

B

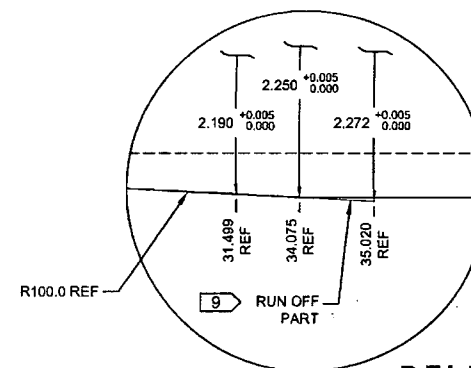
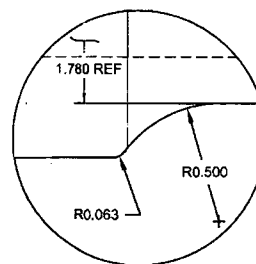
A



UNDER REVIEW

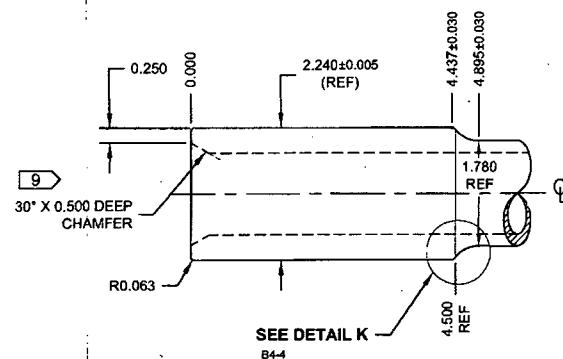
11.06.13

**TURNING DETAIL**



RELEASED

DETAIL L:  
TAPER RUN-OFF  
NOT TO SCALE



DETAIL J:  
CROSSTUBE CUFF  
NOT TO SCALE

DETAIL K:  
CUFF TRANSITION  
NOT TO SCALE

72915

DESIGN	9	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF		
CHECKED	9	DRAWING NO. D206-667-241	REV. C SHEET 4 OF 4
MFG. APPR.	9	TITLE CROSSTUBE ASS'Y (206B HIGH AFT)	SCALE NTS
DE APPR.	9	<small>COPYRIGHT © 2000 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSES OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	
DATE	08.11.06		

8 7 6 5 4 3 2 1

